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ABSTRACT

The purpose of this report is to provide local school administrators with information about occupational clusters as well as suggested strategies for implementing a career cluster concept approach at the local level. The techniques and procedures presented in this paper need to be modified and adapted by an administrator to conform with local school conditions and priorities. Renewed interest in career education underscores the following general societal needs that educational planning must consider: (1) the need to adapt easily to socioeconomic changes, (2) the need to plan for individual geographic mobility, (3) the need to provide individuals with occupational versatility, and (4) the need to provide students with greater flexibility in occupational choice patterns. Studies which identify various types of occupational clusters and curriculum development efforts are reviewed to provide a rationale for the career cluster concept. Alternative approaches and procedures for implementing the cluster concept and an interdisciplinary approach to an individualized instructional system are presented. A number of resource materials and an extensive bibliography are appended. (Author/AG)

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CAREER CLUSTER CONCEPTS

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INTRODUCTION

A renewed commitment to career education has generated a need for information about implementing a cluster concept approach in the public school systems throughout the country. The implementation of the cluster concept will require the modification of existing programs and a change in roles on the part of students, teachers, and administrators. It is the purpose of this presentation to provide local school administrators with information about studies in this area as well as suggested strategies on implementing a career cluster concept approach in their respective schools.

PROBLEM STATEMENT

Recent interest in career education has reemphasized the need to provide young people with an opportunity to select a career of their choice and obtain the necessary requisites to function successfully in that career. An important component of career education that provides for exploration and preparation for a number of careers or occupations is a cluster concept approach. An examination of various sources concerned with contemporary social, economic, and educational issues has established several underlying reasons or needs for a cluster concept approach in career education.

There is a need to develop individuals who will be adaptable to technological, social, and economic changes. The Bureau of Labor Statistics has indicated that different employment rate growths among various industries directly affect the occupational structure of the nation's work force. These rates of employment growth result from shifts in income distribution, changes in consumption patterns, growth in population, government policies, union-management relationships, supply and demand conditions of labor, and the development of new products and processes (U.S. Department of Labor, 1969).

An implication for vocational education relative to the impact of social, economic, and technological changes is presented by Venn:

> ...Most young people today will have to change occupations four or five times during their lives. Therefore, a long range policy of teaching simple, specific job skills no longer makes sense; yet specific entry skills are required for that first job. Workers must be trained for clusters of jobs so they may switch from one job to another as technology advances. This dilemma is a major challenge facing educators, labor, industry, and business (Venn, 1969:26).

There is a need to provide individuals with a greater degree of mobility on a geographical basis. The Bureau of Census reports:

> Of the 185.3 million persons 1 year old and over living in the United States in March, 1964, 36.3 million, or 19.6 percent, had been living at a different address in the United States in March, 1963....The peak mobility rate occured among persons in their early twenties--the age at which most young people leave their parental home to find employment (U.S. Department of Commerce, 1965).

Wiles makes the following proposal for vocational education with respect to population mobility:

> Vocational education can no longer be planned solely in terms of the community in which a high school exists. Over half of the average schools' graduates will migrate to another community, and many will go to another state. Seemingly the wisest step for curriculum planners to take, then, is to study industrial and commercial operations and plan in terms of clusters of competencies. When a student has developed a particular set of abilities he may enter a variety of related occupations (Wiles, 1963:126).

There is a need to provide individuals with versatility for positions within an industry or occupation. The Department of Labor reports that the "average 20 year-old man in the work force could be expected to change jobs about 6 or 7 times and spend about $5\frac{1}{2}$ years on each job during his remaining working life of about 43 years." The report indicates job mobility is highest during the early years of a work career and approximately two of the expected lifetime job changes will occur between the 20th and 25th birthdays (Garfinkle, 1964).

Garfinkle (1964) notes that:

> These figures illustrate that initial training of young men should be broad and general in order to give them the flexibility necessary to meet changing job demands. Furthermore, better training for jobs and good occupational guidance might make it easier to reduce some of the trial and error involved in finding jobs.

There is a need to provide students with greater flexibility in occupational choice patterns. Baer and Roeber have commented on the advisability of preparation for several occupations:

> Since most young people have a broad range of interests and capabilities, appropriate initial choices are facilitated by a knowledge of families of occupations. It is becoming more generally recognized that early training, even at the college level should be broad enough to give the student the background for a group of related occupations. Thus, he is not driven into a specific occupational choice before his interests have matured sufficiently for him to choose a field of work. When he is ready to enter the job market, his chances of successful placement are increased if he is prepared to begin at any one of several jobs in a given field of work

(Baer and Roeber, 1964:167).

The final report of the Panel of Consultants on Vocational Education contains the following recommendation:

> Basic vocational education programs should be designed to provide education in skills and concepts common to clusters of closely related occupations. The curriculum should be derived from analyses of the common features of the occupations included. These students should receive specialized or more advanced vocational training later in post-high school programs, apprenticeship, or on-the-job experiences (U.S. Office of Education, 1964).

REVIEW OF LITERATURE

The term "cluster concept" connotes various interpretations for many educators. The interpretations range from those emphasizing general skills and knowledges common to a variety of occupations (Altman, 1966) to those which specify job entry competencies for a small number of related occupations (Frantz, 1971b). A number of studies have been conducted along this continuum to identify elements which are common to families or clusters of occupations. The studies have been classified according to a scheme suggested by Cunningham (1971b) combined with commonalities related to a type of occupational cluster. The classification scheme, as shown in Figure 1, categorizes the research in two major dimensions, each containing three categories as described below:

I. Types of Clusters

A. Wide Variety of Occupations - large number of unrelated occupations, i.e., dentist, part worker, programmer, etc.

B. Several Occupational Groupings - occupations in two or more families, i.e., data processing and office occupations.

C. Closely Related Occupations - small number of occupations related on the basis of similar products.

II. Types of Commonalities

A. Attributes - characteristics of personalities such as attitudes, interests, temperaments, needs, abilities, i.e., mechanical ability.

B. Activities - behaviors dealing with worker functions and performances, i.e., typing.

C. Knowledge and Skills - cognitive and psychomotor behaviors applied in performing a specific task, i.e., measuring with a scale.

The classification scheme may be useful to local school administrators in implementing the career education model proposed by the U.S. Office of Education (1972b). Studies concerned with human attribute commonalities across a wide variety of occupations may be applicable in planning programs for career awareness in grades K to six. Learning experiences could be designed from the results of these studies to provide an understanding of self characteristics as they are related to a cross section of the occupational spectrum. The activities and behaviors related to several occupational clusters could be used for career exploration programs in grades seven to nine where simulated learning activities requiring students to assume work roles could be based upon activities performed in a number of occupations within a cluster. The specific knowledge and skill requirements for a cluster of closely related sets of occupations could provide career selection and preparation experiences for students in grades 10 to 12.

Attributes Related to a Wide Variety of Occupations (IA, IIA) Fleishman (1966) has analyzed 31 occupations representing a wide range of performance requirements in order to derive a set of general vocational capabilities. The study identifies a domain of vocational capabilities in the areas of mechanical, electrical, spatial, chemical-biological and symbolic. It also identifies people who "can be a focal point for the development of vocational awareness, vocational choice, and career planning."

Volume II of the Dictionary of Occupational Titles categorizes worker characteristics and functions for a multitude of occupations (U.S. Department of Labor, 1965). Ghiselli (1966) derives two major clusters and eight subclusters of occupations based on intercorrelations of four ability dimensions of intellectual abilities, perceptual accuracy, motor abilities and spatial-mechanical abilities. The study concludes that it is possible to group occupations on the basis of human requirements, but occupations appearing to have similar work may have different ability

requirements, and jobs which appear to be different may have similar requirements.

A study by Dillon and Horner (1967) analyzes the requirements of 384 different occupations and recommends that the common groups of activities and areas of knowledge be used as a base for vocational course construction. Cunningham (1969, 1971) and his associate (Riccobono, 1971) have developed an Occupation Analysis Inventory (OAI) and an Attribute Requirement Inventory (ARI) which were used to produce clusters of occupation based upon a work dimension and attribute requirement profile.

Activities Related to Several Occupational Groupings (IB, IIB). Sjogren, et al. (1967) conducted a study to determine if common behaviors could be identified across occupations for curriculum building purposes. They directed interviews with job incumbents in metal fabrication and agricultural occupations. A factor analysis of the data produced common behaviors for occupational clusters of production agriculture, agricultural industries, agricultural businesses, skilled metal workers, semi-skilled metal workers and metal businesses. Thomes' (1952) study identifies several work components constituting office occupations. These include typing, listing and compilation, communication, planning and supervising, filing, stock handling, routine clerical operations, and calculation. Hamreus and Langvin (Watson, et al., 1965) have analyzed 18 jobs and determined commonalities of basic tasks into three clusters of drafting jobs, truck repair jobs, and electronics and welding repair jobs.

Knowledge and Skills for Closely Related Occupations (IC, IIC). A study conducted by Bakamis, et al. (1966) identifies basic skills, science, mathematics and communications used in performing tasks related to 10 building trades. Mills (1966) identifies common knowledges used by electronic technicians. Shill and Arnold (1965) analyze skills and knowledges common to six technologies and recommend a core program for preparing technicians. A project conducted by Maley (1966a-d) and his associates at the University of Maryland identifies skills and knowledge for job entry into occupations comprising three clusters: (1) metal forming and fabrication, (2) electro-mechanical installation and repair, and (3) construction.

Clusters of tasks associated with various types of office work are identified by Perkins, et al. (1968) at Washington State University. O'Donnell (1967) examines several occupations related to home and community services and describes the requirements for entering these occupations. In separate studies, Ridley (1967) and Shipley (1967) identify skills and knowledge required for employment in various occupations related to home economics. Rahmlow, et al. (1966) investigate the

I. TYPES OF CLUSTERS

II. TYPES OF COMMONALITIES

A. Attributes B. Activities C. Skills and Knowledge

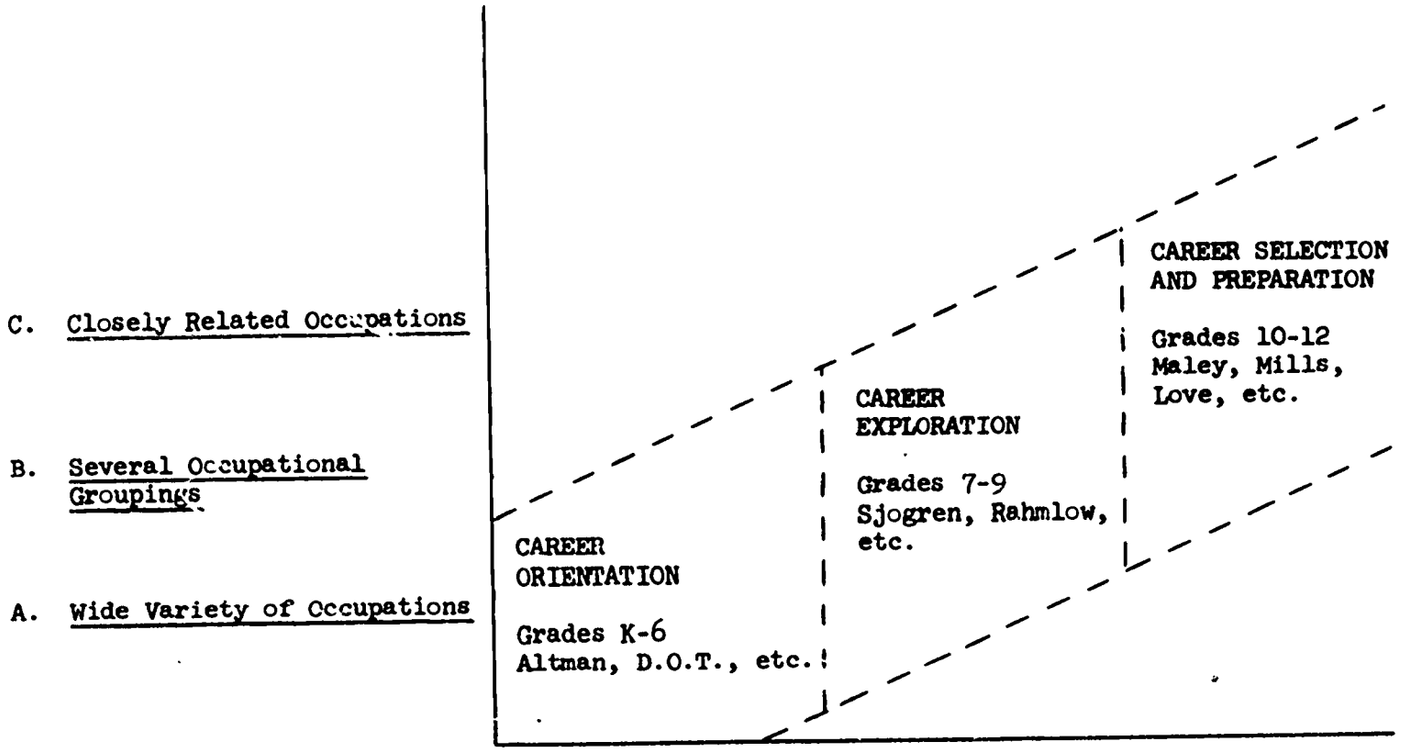


Figure 1. Possible Cluster Concept Research Applications for Career Education Programs

competencies associated with child care and food service occupations.

A study by Fullerton (1966) identifies common courses for paramedical education programs. Other studies in the health occupations area have developed the "core concept" which identifies commonalities by programs and level (Davis, 1965; Kinsinger and Ratner, 1966; Wallenstein, 1968; Gilpatrick, 1968).

Several studies have identified clusters of knowledge and career ladders for public service occupations (Grant, et al. 1969; Institute for Local Self Government, 1969).

Coster and his associates note common competencies for agricultural occupations using a factor analysis technique (Coster and Courtney, 1965; Coster and Penrod, 1965; Clouse and Coster, 1965). In separate studies, Gunderson, et al. (1966) and Drake (1968) have analyzed job titles and competencies needed for off-farm occupations. Courtney's study (1962) determines common knowledge requirements for a farmer, farm real estate broker, and a grain elevator operator. As a result of Long's research (1968), Courtney was able to classify clusters of tasks for seven types of agricultural production.

In the area of business and office education, Peck and Denman (1968) have identified personal characteristics, knowledges, and skills that employees in marketing and distribution should have in order to perform effectively on the job. Ertel (1968) has determined the major types of tasks performed by merchandising employees working in department and variety stores.

Curriculum Development

Although many researchers have recommended that their studies be used as a base for curriculum development, very little has been accomplished in planning instructional programs from the research results. Several authors have suggested methods of developing curriculum for a cluster concept approach to vocational education (Frantz, 1971a-b; Sjogren, 1969; Rahmlow, 1969).

Maley and his associates at Maryland have prepared course outlines for metal forming and fabrication, electro-mechanical installation and repair and construction which were subsequently field tested in several pilot programs (Maley, 1966). Project ABLE in Quincy, Massachusetts has developed learning packages for several industrial education programs (Asbell, 1967). A plan which outlines skills and knowledge needed for entry into three metal trades of machinist, sheet metal worker, and

welder has been prepared by Mississippi State University (1967).

The Massachusetts Division of Occupational Education has sponsored a project which identifies skills and knowledge for current, new and emerging occupations. The information will be stated in behavioral terms, organized in an instructional sequence, and placed in a data bank for retrieval by school systems (Commonwealth of Massachusetts, n.d.).

A project is underway at the University of Georgia to prepare an individualized instructional system for 10 multi-occupational programs in vocational education. Approximately 500 learning packages are being field-tested and evaluated in 10 demonstration programs during the 1972-73 school year (Frantz, 1971b). The state of Oregon has prepared curriculum guides for cluster programs that include marketing, agriculture, clerical occupations, metals, electricity and electronics, food service, health occupations, mechanical, secretarial, bookkeeping and accounting, clerical, construction, and forest products (Oregon Board of Education, n.d.).

A curriculum project currently underway in Indiana will identify career lattices and prepare learning packages for several clusters (West, 1972). The U.S. Office of Education has contracted with several agencies to prepare curriculum material for occupational clusters in the areas of transportation, manufacturing, public services, construction, communications and media, natural resources, agribusiness, and environmental protection.

Program Implementation

The implementation of programs based upon the cluster concept approach has been reported in various sources. A state commitment to the cluster concept in Oregon high schools has been discussed by several authors (Parnell, 1969; Wolansky, 1970). A multi-occupational program for vocational education in grades 10 through 12 has been implemented in Georgia (Frantz and Word, 1971). Kansas City has used the cluster concept in the ninth and 10th grades to orient and prepare students for further specialization in a central vocational-technical facility (Sheets and Dahlor, 1967). The Galaxy Plan in Detroit allows students to select occupational clusters in the junior high school and progress to a specialty in the senior high school program (Turnquist, 1965). Olson (1965) has described a similar approach in the Pittsburgh public schools. The Skyline Center in Dallas, Texas has initiated a high school program based upon 27 occupational clusters (Dallas Independent School District, n.d.).

A project in Sanford High School, (1971) North Carolina is developing an individually scheduled cluster curriculum in occupational education. In Jacksonville, Florida, a project entitled "Planning for a Pre-Technical Curriculum" is being developed based upon the cluster concept approach (Duval County School Board, 1971). The Rawlins Public School System in Wyoming is currently implementing a cluster concept program which provides job entry capabilities for a number of occupations (Kotch, 1972).

Summary

The information presented in this section concerns a rationale for the career cluster concept, studies identifying different types of occupational clusters, curriculum development efforts, and actual implementation of cluster concept programs throughout the country. An attempt has been made to provide information that would be of value in the process of implementing career cluster programs in local school systems. The following section provides further discussion about possible approaches and procedures that may be useful in the development and implementation of a career cluster concept approach in a local school program.

IMPLEMENTING THE CAREER CLUSTER CONCEPT

One of the primary purposes of career education is to provide an opportunity for students to become aware of careers beginning at the elementary school level, orientation and exploration at the middle/junior high school, selection and preparation for job entry into a number of careers in the secondary school with specialization and depth at the post-secondary level. In order to implement the cluster concept approach in a career education program in a local school system, several activities must be considered which involve selection of cluster programs, program organization and design and staff preparation.

Cluster Identification

The initial activity will require the collection and analysis of data concerned with student interests as well as current and anticipated employment opportunities on a local, regional and national basis. Priority should be given to identifying student interests at the secondary school level as these young people are at the age where important career decisions are being made.

After collecting and analyzing available information and data, a decision must be made to determine the career clusters to select for a local school program. Several criteria have been suggested for selecting occupational clusters (Maley, 1966; Frantz, 1971b). Some criteria that may be useful in selecting the clusters are:

1. A favorable employment outlook is expected on a local, regional and national level.

2. Student interest in enrolling in the programs based upon the clusters is evident.

3. The instructional capability of being implemented exists in terms of curriculum, facilities and staff.

4. Opportunities for advancement are available for graduates of the cluster programs through further schooling, on-the-job training, or apprentice programs.

Career awareness and exploration in the elementary and middle school programs should incorporate but not be restricted to the secondary clusters as it is not the intent of the approach to provide a recruiting device for increasing vocational education enrollment, although this may be an ancillary result. The information from a secondary school population may provide some constraints. However, it is imperative that a logical and progressive sequence of awareness, exploration, selection and preparation for a number of careers be available for students at various grade levels.

The clusters selected for the elementary and middle/junior high school levels should be broad families of careers and occupations that are related and can be examined by students in terms of similar kinds of attributes, activities, work roles, levels of ability, services rendered or products produced. Several classification systems developed by Roe (1956), Holland (1966), Super (1957), and the U.S. Department of Labor (1965), could be used in establishing career education programs for the elementary and middle/junior high school levels.

In order to facilitate the process of selecting career clusters in a systematic manner, a rating procedure may be utilized by an advisory panel consisting of local school and community resource people. A list of tentative career clusters should be prepared and rated in terms of their relationship with the criteria. The clusters which have the best "fit" with the criteria would be selected for implementation in the local school program.

Developing An Instructional System

After identifying the career clusters, an instructional delivery system must be developed for the programs. The initial step in the process would be to obtain curriculum material that is readily available and compatible with the selected career cluster programs. The available material, as cited in the previous section, ranges from content identification to individualized instructional packages. A survey of existing programs within the school may provide another source of curriculum material that can be readily adapted for inclusion in a career cluster approach.

This information should be synthesized and prepared for the target population in accord with an overall instructional systems model as shown in Figure 2. The first procedure in developing the instructional system would be to outline the content of each career cluster program. The content outlines could be submitted to advisory committees at this point for their review and recommendations in terms of suitable orientation and exploration experiences, or competencies needed for job entry into careers comprising the selected clusters, depending upon the program level. Units, or learning modules, listed as content in the outlines, are then written as terminal performance objectives. The objectives should state with precision and clarity what is to be learned and how the learner will exhibit the acquired knowledge, skill, or attitude as prescribed by a number of authors (Mager, 1962; Kibler, et al., 1970; Gronlund, 1970).

After carefully specifying learning outcomes in performance terms, a learning sequence should be established through which the learner will progress in order to attain the terminal objective. The terminal objective is broken down into subobjectives which are arranged in a sequential manner (Popham and Baker, 1970). One way to develop the learning sequence is to ask the question: What must the student be able to do in order to successfully attain the next step in the sequence?

The result of this self-interrogation is the establishment of a sequence which arranges the subojectives in a learning hierarchy as shown in the curriculum guide example in Appendix B.

Upon completion of the learning sequence, learning resources must be identified or developed for each subobjective. Many of the required learning resources are available and can be readily identified by using indexes and directories which have compiled commercially obtainable resources as Indexes to 16mm films, 35mm filmstrips, 8mm cartridges, audio tapes, records (NICEM, 1971). The required tools, utensils, materials, and equipment could also be specified at this time which will assist in the process of the planning of physical facilities.

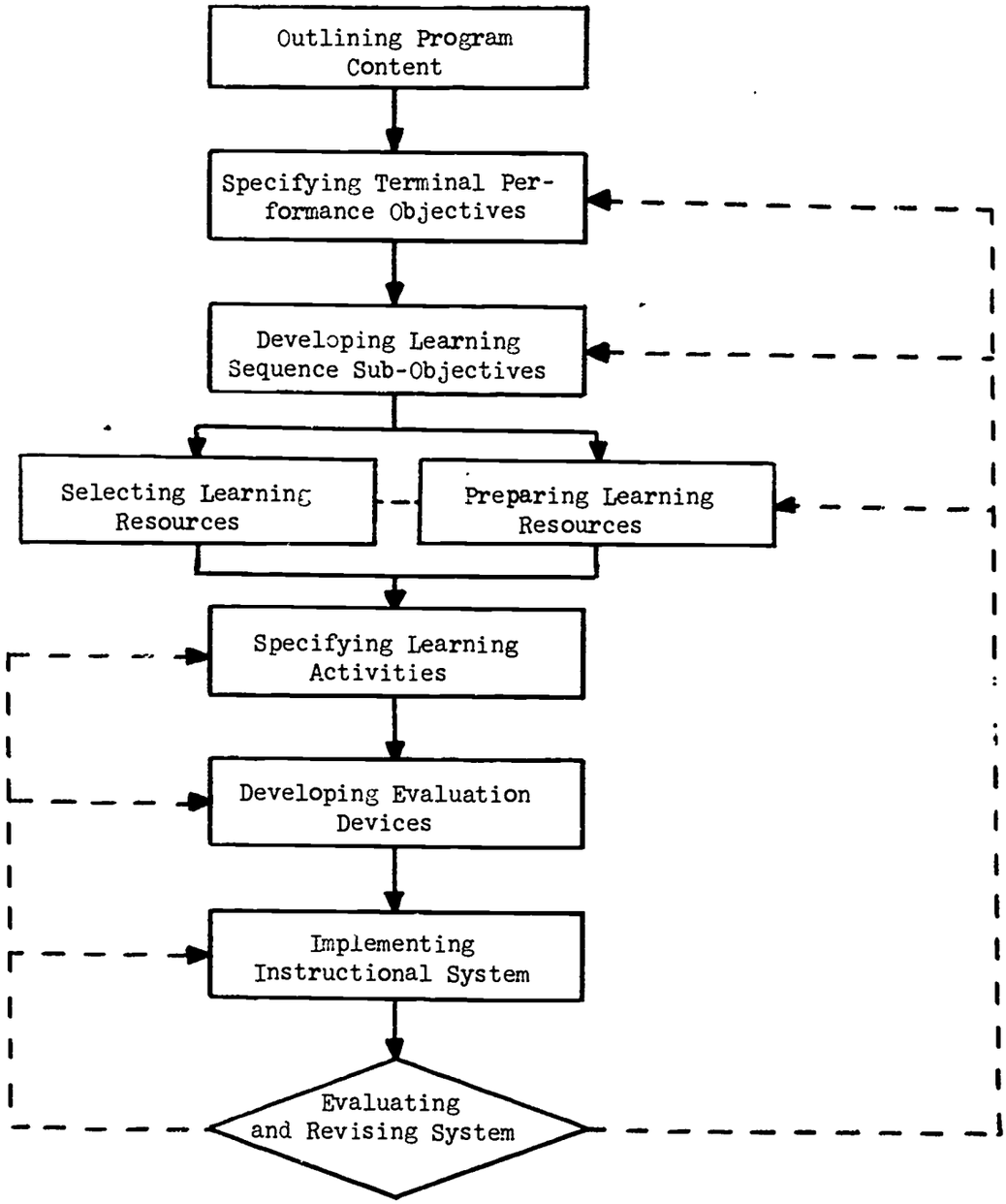


Figure 2. Developing an Individualized Instructional System

In conjunction with identification of resources, a series of learning activities must be prepared which are consistent with the behavior stated in the subobjective. The learning activities provide an opportunity for students to use or apply the knowledge or skill gained from the learning resource in simulated or practice sessions. It is important to identify or develop a variety of learning resources and activities in order to provide students with a range of learning modes for the attainment of each subobjective.

The final step in the process is the development of devices that diagnose and monitor student progress through the learning sequence. Instruments should be prepared to provide information about prior student experiences and knowledge which can then be used to introduce students to the appropriate level in the learning sequence. Other instruments that evaluate student attainment of the subobjectives and terminal objectives will need to be developed. The information compiled as a result of this procedure may be presented in the typical curriculum guide as shown in Appendix B or in a learning package format as shown in Appendix C.

Modifying Program Organization

Upon completion of the instructional system, the organization of the career cluster program should be considered by the local school administrator. There are several organizational patterns that may be appropriate to utilize, depending upon the local school environment. One approach, which could enable a small, financially limited school to provide extensive career exploration and preparation, utilizes facilities designed to encompass several occupational learning areas within the confines of a single laboratory. An operational example of this approach is a construction cluster program where learning areas dealing with carpentry, masonry and plumbing are provided for students. The students in this approach would obtain competencies within one laboratory for entry into several occupations related to the field of construction.

Another approach, which may be a logical direction for schools that have existing physical facilities for single occupational programs, is a modular arrangement. The modular arrangement is aimed at providing career exploration and preparation for a wide spectrum of occupations not necessarily within the confines of a single laboratory. Students in a modular approach could choose from a list of objectives, or learning modules, those basic competencies that would enable exploration of and entry into a variety of careers. For example, a student expressing an interest in the field of agribusiness would need modules of instruction in marketing and sales, bookkeeping, soils, and fertilizers, to name just a few. Students could initially select and combine modules in

several program areas that would enable them to obtain the competencies needed for careers in agribusiness.

The organization of the career cluster programs will necessitate the modification of course offerings and scheduling procedures in order to provide students with the options and flexibility needed to make career decisions and obtain competencies for a cluster of occupations. One approach to the problem of enabling students to acquire competencies needed for a number of occupations is to expand the number of courses offered by combining learning modules into a nine or 12 week quarter course. A series of quarter courses involving basic drafting, beginning typing, or development of small children could be offered as separate and distinct courses which begin and end within a quarter (Schoenholtz, 1972).

A number of quarter courses for a middle/junior high school program could be developed to enable students to examine careers concerning marketing and sales, natural resources, manufacturing, health, and food services. Students could select and reschedule courses each quarter which might better accommodate their career interests and abilities as well as provide competencies which would transfer across a wide spectrum of occupations and careers.

The development of a quarter course system would require a review of the curriculum guide in order to organize learning modules into distinct and identifiable course offerings which students could complete during a quarter of the school year. A course description should then be prepared for each course and used in orientation sessions for the faculty, parents, and students to acquaint them with the quarter system and available course options. Opportunities should be given for parents and students to visit laboratories and classrooms to discuss the courses with each teacher. Guidance counselors would then work with students in small groups and individually to discuss the merits of course selections in terms of their interests, abilities and aspirations.

Student scheduling of the courses is most efficiently accomplished by devoting several days during the end of the school year to register students for all courses for the following year. During the following year, students would then be given the opportunity near the end of each quarter to readjust their schedules for the following quarter if they have modified their original plans.

Utilizing an Interdisciplinary Approach

The cluster concept in a career education program should not remain isolated and separated from the total school environment. The principles

and concepts of other subject areas within a school would need to be acquired by students in order for them to function creditably in a wide variety of careers. The laboratory and classroom activities of a cluster program could serve as motivating devices for student acquirement of skills, knowledge, and attitudes taught in other disciplines. For example, number operations treating fractions might be applied in a variety of learning activities involving measurement. The mathematics teacher could teach the basic concepts dealing with fractions and provide students with assignments directly related to an activity being performed by the student in a cluster program classroom as opposed to assigning students several problems at the end of a chapter in a textbook. Perhaps the approach would assist teachers in motivating students to attain the objectives of both programs.

The preparation and planning of an interdisciplinary curricular approach could be initiated by discussing the proposal with administrative and supervisory personnel within the school system. If positive approval of the approach is provided by administrative personnel, the total school faculty would need to be informed of the interdisciplinary approach and their responsibilities in the implementation process. The faculty should be provided time to react and discuss the proposal in small group sessions over a brief period of time. If the faculty provides a positive reaction to the inter-disciplinary approach, teaching teams would be formed, composed of only those interested teachers who have students jointly enrolled in courses. Communication sessions should be held by the teaching team in order to acquaint each other with the objectives and activities of each subject area.

After informing each other of their respective subject areas, a team is ready to begin implementing the inter-disciplinary approach. At the beginning, it is advisable to relate the curriculum on a monthly basis, rather than weekly or daily, due to the amount of communication and planning involved in the process. The subject area teachers comprising the team would select a topic or unit of instruction to be taught at a predetermined time during the month. This information would be transmitted to a group and responses would be given by the cluster program teachers regarding its application in their classrooms.

Classroom implementation of the inter-disciplinary approach would involve selection of instructional strategies by subject matter teachers that would enable students to acquire the desired knowledge, attitudes, or skills. Assignment sheets or contracts would be prepared with the assistance of the cluster program teachers to provide actual application by the student of the knowledge needed to successfully complete a laboratory or classroom activity. After student completion of the instructional unit, the teaching team would meet to discuss the results and

evaluate student achievement of the assignment.

Individualizing the Instructional System

In order to completely implement the career cluster concept, an individualized instructional system will need to be utilized by teachers in their classrooms and laboratories. Teachers will be faced with problems in managing and directing the activities of students engaged in several occupational areas and in many different learning modules. Students enrolled in career cluster programs will have various degrees of interest, different levels of ability, and a wide range of prior experiences (see Figure 3). Many of the usual instructional methods will not be completely adequate with respect to maintaining student interest and achievement.

The individualized instructional system may be developed by using the information found in the curriculum guide.

The information obtained as a result of the instructional systems development process may be "packaged" (see Appendix C) and utilized with students to individually attain the competencies comprising a career cluster program.

Students utilizing an individualized instructional approach in a career cluster program would initially engage in a diagnostic procedure that would identify prior knowledge and experience with respect to one learning module objective. Diagnostic procedures could be used which range from student interviews to a performance check which determines a specific skill level. Upon completion of the diagnostic procedure, the teacher would prescribe the exact subobjective for the student to begin the learning sequence. The student would then utilize the learning package (see Appendix B) which is designed to assist the student in attaining a subobjective. The learning package identifies the subobjective, learning resources, activities and evaluation procedure for the student.

The student, upon reading the subobjective, would select a learning resource and engage in a learning activity where knowledge is applied or a skill is practiced as stated in the subobjective. After completing the learning activity, a student would exhibit achievement according to the criterion specified in the subobjective. If a student is successful, advancement would be made to the next learning package in the sequence leading to attainment of a terminal objective. A student who was not successful would be directed by the teacher to a remedial procedure that would ultimately enable the student to attain the subobjective successfully (Frantz, 1972).

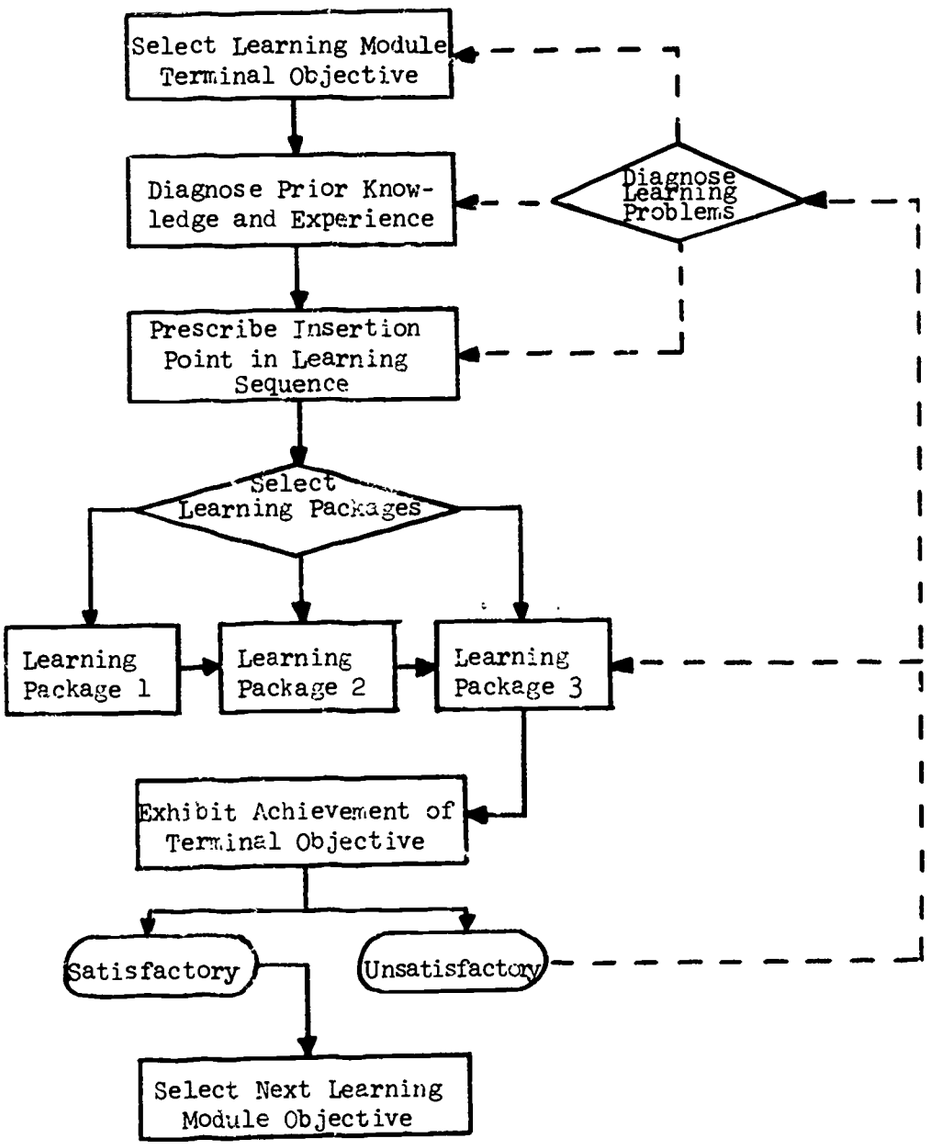


Figure 3. Implementing an Individualized Instructional System

Staff Orientation and Development

An important component of the implementation process is staff orientation and development. It is essential that all staff, including administrators as well as teachers, have a basic understanding and knowledge of the career cluster concept. The advantages, disadvantages and limitations must be thoroughly explored and discussed in terms of role changes on the part of students, parents, teachers and administrators. Students and parents will have to assume responsibilities and make decisions about selecting appropriate courses. Teachers will need to work in teams and plan classroom activities jointly for individual students. Administrators will be required to develop procedures that allow flexibility for course scheduling and teacher planning. The implications of these role changes must be identified, and realistic solutions be proposed in order for the staff to be fully participating members during the implementation phase.

The success of the implementation process will be directly related to the attitudinal set of those involved in implementing the concept. The decision to proceed should be made jointly with participating administrators, teachers, community representatives and school board members.

The most critical role change for cluster program teachers concerns their movement from a single occupational approach to a multi-occupational instructional approach. In order for teachers to move in this direction, cross-training in the required occupational skills and knowledge must be provided for them.

The teachers will need to identify their strengths and weaknesses with respect to the required competencies for each cluster program. This may be accomplished by having teachers rate their proficiency with respect to each learning module that was identified in the development of the instructional system. The modules that require additional training could then be used in establishing an individually tailored training program for each cluster teacher. Several methods of accomplishing this may be utilized which include workshops conducted by industrial and business organizations and part-time employment with local businesses. The instructor must be prepared to teach the competencies comprising the cluster program if it is to be successfully implemented.

CONCLUSION

The implementation of a career cluster concept approach will require different patterns of program organization, instructional strategies, scheduling procedures and staff preparation. The techniques and procedures presented in this paper will need to be modified and adapted by an administrator to conform with local school conditions and priorities. The planning of a new school will enable an administrator to design physical facilities, select staff and organize a program with fewer restraints than an administrator of an already existing program. The final result should provide students with experiences needed to make tentative career decisions and enable them to acquire basic competencies needed to function successfully in a variety of careers.

APPENDIX A

A PROPOSED ACTIVITY SCHEDULE FOR THE IMPLEMENTATION OF A CAREER CLUSTER CONCEPT APPROACH

EVENT	ACTIVITY
1-2	Investigate career cluster concept by local school administrator.
2-3	Discuss career cluster concept with local school administrators, faculty, and community.
3-4	Collect local, regional, and national manpower needs and student interest information.
5-6	Determine criteria for selecting career clusters.
6-7	Select career clusters.
7-8	Outline career cluster program content.
8-9	Prepare career cluster program terminal objectives.
9-10	Identify learning resources and activities for sub-objectives.
11-12	Develop evaluation devices and procedures.
12-13	Compile and print information in curriculum guide and/or learning packages.
13-14	Determine physical facility requirements.
14-15	Compile and order needed equipment and instructional material.
15-16	Modify physical facilities and install equipment.
16-17	Determine program organization.
17-18	Develop student scheduling procedures.
18-19	Orient students and parents.

EVENT	ACTIVITY
20-21	Schedule students for the career cluster programs.
21-22	Prepare staff according to professional and technical competencies needed.
22-23	Implement career cluster concept programs.

APPENDIX B

A CURRICULUM GUIDE EXAMPLE FOR A CAREER CLUSTER PROGRAM IN HEALTH OCCUPATIONS

Career Cluster Program: Health Occupations*

Learning Module Title: Measuring Body Temperature

Terminal Objective: Take and record TPRs for fifteen patients and leave all thermometers ready for re-use, according to hospital procedure. No thermometer readings should deviate more than 0.2° from the readings of the supervising nurse. There should be no break in aseptic technique, and all TPRs should be recorded on the graphic sheet without error.

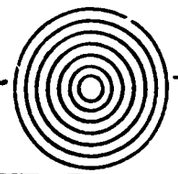
SUB-OBJECTIVES (1&2 of 11)	LEARNING RESOURCES	LEARNING ACTIVITIES	EVALUATION
1. Read five different types of thermometers and record the reading in correct numerical form without error.	Book: Being a Nursing Aide, Chapter 10, p. 8. The Health Assistant, p. 97. Activity sheet on thermometers - various kinds of thermometers	Students: Study textbook readings - Observe different types of thermometers Complete the Activity Sheet	Give students five different types of thermometers and check their readings as recorded on the evaluation sheet
2. Differentiate between oral and rectal thermometers and read any clinical thermometer accurately and record the reading in correct numerical form to within 0.2° of the teacher's reading, etc.	Health Assistant, p. 97. Being a Nursing Aide, Chapter 10, pp. 8-10. Simplified Nursing, p. 260. Filmstrip: "TPR"	Students look at display of clinical thermometers Practice reading the thermometers	Give students five clinical thermometers and ask to identify rectal and read and record five temperature readings

*This material is adapted from curriculum developed by Dr. Mary Elizabeth Milliken, Assistant Professor, Division of Vocational Education, College of Education, University of Georgia, Athens, Georgia.

APPENDIX C

A LEARNING PACKAGE EXAMPLE FOR A SUBOBJECTIVE FROM
A CAREER CLUSTER PROGRAM IN HEALTH OCCUPATIONS

PLACE PACKAGE
READING CLINICAL THERMOMETERS*



OBJECTIVE

Upon completion of this PLACE, you will be able to:

A. DIFFERENTIATE BETWEEN ORAL AND RECTAL THERMOMETERS; AND

B. READ ANY CLINICAL THERMOMETER ACCURATELY AND RECORD THE READING IN CORRECT NUMERICAL FORM; THE READING SHOULD NOT VARY MORE THAN 0.2° FROM THE TEACHER'S READING.

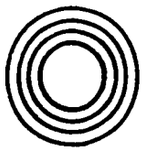
RESOURCES

To help you reach your objective on READING CLINICAL THERMOMETERS, use the following resource materials.

Books: HEALTH ASSISTANT, P. 97
BEING A NURSING AIDE, CHAPTER 10, PP. 8-10
SIMPLIFIED NURSING, P. 260

Filmstrip: TRAINEX BN 105 "TPR"

*Planned learning activity for career education package developed by Dr. Mary Elizabeth Milliken, Assistant Professor, Division of Vocational Education, University of Georgia.



ACTIVITY

1. Look at the laboratory display "Clinical Thermometers."

   a. Compare oral and rectal thermometers, noting differences in shape and markings. Pay particular attention to any mark which is supposed to identify a thermometer as a rectal type.

   b. Notice the markings (calibrations) and answer the following questions:

      Is this a Fahrenheit or a Centigrade thermometer?_____

      What is the lowest mark on the thermometer?_____

      What is the highest mark on the thermometer?_____

      How is "normal temperature" marked?_____

      What is the value of each line between whole numbers?_____

2. Practice reading the thermometer. If you have difficulty finding the mercury column, use another resource and continue to practice.

3. When you think you know how to read a clinical thermometer, go to the laboratory display "Reading Clinical Thermometers." Read these ten thermometers and record your readings. Check your readings against the KEY. If you have 8 readings which do not differ from the KEY by more than 0.2^{o}, ask the teacher to let you demonstrate reading clinical thermometers.

EVALUATION

You will be given five clinical thermometers; you will:

1. Correctly identify those which are rectal thermometers;
2. Read all five thermometers with no more than 0.2^{o} difference from the teacher's reading; and
3. Record all five readings in correct numerical form.

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[1] Bibliographical entries followed by an ED number are generally available in hard copy or microfiche through the Educational Resources Information Center (ERIC). This availability is indicated by the abbreviations MF for microfiche and HC for hard copy. Order from ERIC Document Reproduction Service (EDRS), P.O. Drawer O, Bethesda, Maryland 20014. Payment must accompany orders totaling less than $10.00. Doctoral dissertations with a microfilm number are available in microfilm ($4.00) or xerographic copy ($10.00) from University Microfilms, Dissertation Copies, Post Office Box 1764, Ann Arbor, Michigan 48106.

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The mission of the ERIC CLEARINGHOUSE ON VOCATIONAL AND TECHNICAL EDUCATION is to acquire, process, and disseminate research and related information and instructional materials on vocational and technical education and related fields. It is linked to the Educational Resources Information Center (ERIC), the national information system for education.

PRODUCTS

The information in the ERIC system is made available to users through several information access products. Documents and journal articles are acquired, selected, abstracted, indexed, and prepared for announcement in these publications. The document's abstract can be read in the same ERIC publication in which it is indexed. The full text of announced documents is available from the original source or from the ERIC Document Reproduction Service (EDRS) in microfiche and hard copy form.

* ABSTRACTS OF INSTRUCTIONAL MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (AIM), a quarterly publication, provides indexes to and abstracts of a variety of instructional materials intended primarily for teacher or student use.

* ABSTRACTS OF RESEARCH MATERIALS IN VOCATIONAL AND TECHNICAL EDUCATION (ARM) is published quarterly and provides indexes to and abstracts of research and related materials.

* COMPUTER TAPES of AIM and ARM contain resumes of over 6,000 documents on vocational and technical education that have not appeared in RIE.

* RESEARCH IN EDUCATION (RIE) and CURRENT INDEX TO JOURNALS IN EDUCATION (CIJE) are monthly publications. Many of the documents announced in AIM and ARM are also listed in RIE, the Central ERIC publication. Journal articles reviewed by the Clearinghouse are announced in CIJE, the CCM Corporation publication.

CAREER EDUCATION

A new project, the Supportive Information for the Comprehensive Career Education Model (SI/CCEM), is using the ERIC document base to provide information for the development of the Comprehensive Career Education Model (CCEM). In addition to using ERIC, the project staff is helping to acquire additional materials for CCEM. Many of these are being announced in AIM, ARM, and RIE.

INFORMATION ANALYSIS

The Clearinghouse engages in extensive information analysis activities designed to review, analyze, synthesize, and interpret the literature on topics of critical importance to vocational and technical education. Review and synthesis papers have been prepared on many problems or processes of interest to the entire field. Current emphasis is upon interpretation of major concepts in the literature for specific audiences. Recent career education publications have been developed that clarify and synthesize for program developers and decision-makers the theoretical, philosophical, and historical bases for career education.

USER SERVICES

In order to provide information on ways of utilizing effectively the ERIC document base, the Clearinghouse provides the following user services:

1. Information on the location of ERIC microfiche collections;

2. Information on how to order ERIC access products (AIM, ARM, RIE, and CIJE);

3. Bibliographies on timely vocational-technical and related topics such as (1) career education, (2) vocational education leadership development, (3) vocational education for disadvantaged groups, (4) correctional institutions, (5) cooperative vocational education, (6) information system for vocational decisions, and (7) management systems in vocational education;

4. Brochures describing ERIC operations and products;

5. Directing users to sources of information required for solving specific problems, and

6. Referral of requests to agencies that can provide special services.

YOUR INPUTS

Your comments, suggestions, and questions are always welcomed at the Clearinghouse. In addition, any documents you feel are beneficial to educators may be sent to the Clearinghouse for possible selection and inclusion into AIM, ARM, or RIE.

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DESCRIPTORS - Interdisciplinary Approach; *Administrator Guides; *Occupational Clusters; *Career Education; Educational Needs; *Cluster Grouping; Occupational Choice; Individualized Instruction; Fundamental Concepts; Program Planning; Vocational Development; Resource Materials; Curriculum Development; Concept Formation; *Program Development.
IDENTIFIERS - *Program Implementation.

ABSTRACT - The purpose of this report is to provide local school administrators with information about occupational clusters as well as suggested strategies for implementing a career cluster concept approach at the local level. The techniques and procedures presented in this paper will need to be modified and adapted by an administrator to conform with local school conditions and priorities. Renewed interest in career education underscores the following general societal needs that educational planning must consider: (1) the need to adapt easily to socioeconomic changes, (2) the need to plan for individual geographic mobility, (3) the need to provide individuals with occupational versatility, and (4) the need to provide students with greater flexibility in occupational choice patterns. Studies which identify various types of occupational clusters and curriculum development efforts are reviewed to provide a rationale for the career cluster concept. Alternative approaches and procedures for implementing the cluster concept and an interdisciplinary approach to an individualized instructional system are presented. A number of resource materials and an individualized instructional system are presented. A number of resource materials and an extensive bibliography are appended. (Author/AG)